SOUTH AFRICAN CIVIL AVIATION AUTHORITY

Section/division **Accident and Incident Investigations Division** Form Number: CA 12-57

LIMITED OCCURRENCE INVESTIGATION REPORT – FINAL

Reference Number	CA18/2/3/10187						
Classification	Accident	**Date**	10 July 2022		**Time**	0910Z	
Type of Operation	Training (Part 141)						
Location							
Place of Departure	Lanseria International Airport (FALA), Gauteng Province	Place of Intended Landing	Lanseria International Airport (FALA), Gauteng Province				
Place of Occurrence	On Runway 07 at Lanseria International Airport (FALA), Gauteng Province						
GPS Co-ordinates	Latitude	25° 55' 44.81" S	Longitude	27°56'17.67" E	Elevation	4 393ft	
Aircraft Information							
Registration	ZS-ZIP						
Make; Model; S/N	Cirrus SR20 (Serial Number: 1496)						
Damage to Aircraft	Substantial	Total Aircraft Hours	7 164.8				
Pilot-in-command							
Licence Type	Student Pilot Licence (SPL)	Gender	Male	Age	44		
Licence Valid	Yes	Total Hours	73.2	Total Hours on Type	26.5		
Total Hours 30 Days	6.6	Total Flying on Type Past 90 Days	26.6				
People On-board	1+0	**Injuries**	0	**Fatalities**	0	**Other (on ground)**	0

What Happened

On 10 July 2022, an instructor and a student pilot on-board a Cirrus SR20 aircraft with registration ZS-ZIP took off from Lanseria International Airport (FALA) with the intention to conduct touch-and-go circuit training exercises at the same airport. The flight was conducted under visual meteorological conditions (VMC) by day and under the provisions of Part 141 of the Civil Aviation Regulations (CAR) 2011 as amended.

The student pilot stated that he completed three touch-and-go circuits on Runway 07 with the instructor on-board. Thereafter, the instructor disembarked the aircraft and made his way to the tower where he continued with his instructions to the student pilot whilst he carried on with his solo consolidation circuit training. The student pilot conducted three additional touch-and-go circuit and landing exercises. The fourth circuit and landing exercise was to be a full stop landing. The student pilot stated that during the fourth circuit exercise, he shortened the base leg by turning too early. At final approach, the flap setting was at 50% and the indicated airspeed (IAS) was at 83 knots (kt). The student pilot realised that the aircraft's height was too low at final approach; this led him to add extra power and raise the nose to climb and gain height. Whilst the aircraft was over the runway threshold, he reduced the power which resulted in the aircraft floating over the runway for a while

before touchdown. During touchdown, the aircraft bounced. The student pilot then pulled back on the control stick to settle the aircraft. However, the aircraft experienced a series of bounces before the nose gear bent forward, causing the aircraft to veer off to the left-side of the runway. The student pilot applied the left pedal to vacate the runway; and thereafter, he applied the brakes. During this process, the propeller struck the runway surface. The aircraft came to a stop a few metres from the left edge of the runway. The student pilot then switched off the electrics and shut off the fuel valve before he vacated the aircraft unassisted. The aircraft sustained damages to the nose gear, engine cradle and propeller blades. No person was injured during the accident sequence.

Post-accident, the student pilot stated that the airspace was congested at the time, and this led him to make a rushed decision to commit to land even though the approach profile was not favourable.

A copy of the recordings received from the Air Traffic Service Unit (ATSU) revealed that the frequency in use was 124.0-Megahertz (MHz). At the beginning of the recording, the student pilot called finals to pick-up the instructor. The tower advised the student pilot that the instructor requests him to conduct another touch-and-go circuit. Shortly thereafter, the tower gave the student pilot clearance for touch-and-go; *the surface wind was 360° at 4 knots*, and thereafter, to report right downwind Runway 07. The student pilot acknowledged the information. Moments later, the ZS-ZIP aircraft reported right downwind RWY 07, and the tower advised the student pilot to '*report final approach next number one'*; the student acknowledged this information. After landing, the tower observed the ZS-ZIP aircraft bounce before it veered off to the left-side of the runway. According to the recording, there was no traffic in the circuit; the traffic that was heard in the background was departing for Magaliesburg general flying area (GFA).

Figure 1: The final rest position of the aircraft post-accident. (Source: ATO)

Findings

- The student pilot was issued a Student Pilot Licence (SPL) on 21 December 2021 with an expiry date of 20 December 2022. The student pilot was issued a Class 2 medical certificate on 20 October 2020 with an expiry date of 31 October 2022 with no medical waiver.
- The aircraft was issued a Certificate of Airworthiness (CoA) on 8 July 2021 with an expiry date of 31 July 2022.
- The aircraft's Certificate of Registration (CoR) was issued to the current owner on 5 August 2021.
- The annual inspection on the aircraft was conducted on 5 July 2022 at 7141.90 airframe hours. The Certificate of Release to Service (CRS) was issued on 5 July 2022 at 7141.90 with an expiry date of 5 July 2023 or at 7241.90 hours, whichever comes first. At the time of the accident, the aircraft had accrued 22.9 hours.
- The aircraft maintenance organisation (AMO) that maintained the aircraft had an AMO category rating A and C (airframe and engine). The AMO was issued an AMO certificate on 26 April 2022 with an expiry date of 31 March 2023.
- According to the Pilot's Operating Handbook (POH), the flap setting should be at full (position). However during approach, the flap setting was at 50%. The POH states: "*Landing with 50% or 0 power should be used to achieve normal glide path and low descent rate*". Whilst referencing the Go-around Procedure as presented in the POH, it was found that the aircraft was in a configuration for a go-around, which the pilot elected not to execute. The speed was 83kt and the flap setting was at 50%. The Federal Aviation Administration (FAA)-

8083-3A (Airplane Flying Handbook) states that when a severe porpoising is experienced, *the safest procedure is to EXECUTE A GO-AROUND IMMEDIATELY.* This is reiterated in the FAA Airplane Flying Handbook FAA-8083-3A Chapter 8 (Approaches and Landings). See extract below.

- The Approved Training Organisation (ATO) conducted an internal investigation following the accident. The root cause was attributed to the *student pilot adding more power due to low approach, and thus, [the aircraft] had excess energy on the round out, which caused the aircraft to touch down too fast, resulting in a bounce/porpoised landing.*
- The student had prior experience flying gliders.

Balked Landing/Go-Around (Source: Cirrus POH)

In a balked landing (go-around) climb, disengage autopilot, apply full power, then reduce the flap setting to 50%. If obstacles must be cleared during the go-around, climb at the best angle of climb with 50% flaps. After clearing any obstacles, retract the flaps and accelerate to the normal flaps-up climb speed.

1. Autopilot ..... DISENGAGE
2. Power Lever.....FULL FORWARD
3. Flaps 50%
4. Airspeed.....BEST ANGLE OF CLIMB (81 KIAS) After clear of obstacles:
5. Flaps .....UP

Landing (Source: Cirrus POH)

• Caution •

Landings should be made with full flaps. Landings with less than full flaps are recommended only if the flaps fail to deploy or to extend the aircraft's glide distance due to engine malfunction. Landings with flaps at 50% or 0%: power should be used to achieve a normal glide path and low descent rate. Flare should be minimized.

Normal Landing

Normal landings are made with full flaps with power on or off. Surface winds and air turbulence are usually the primary factors in determining the most comfortable approach speeds. Actual touchdown should be made with power off and on the main wheels first to reduce the landing speed and subsequent need for braking. Gently lower the nose wheel to the runway after airplane speed has diminished. This is especially important for rough or soft field landings.

Floating During Roundout (Source: Airplane Flying Handbook FAA-8083-3A)

If the airspeed on final approach is excessive, it will usually result in the airplane floating. [Figure 2] Before touchdown can be made, the airplane may be well past the desired landing point and the available runway may be insufficient. When diving an airplane on final approach to land at the proper point, there will be an appreciable increase in airspeed. The proper touchdown attitude cannot be established without producing an excessive angle of attack and lift. This will cause the airplane to gain altitude or balloon. Any time the airplane floats, judgment of speed, height, and rate of sink must be especially acute. The pilot must smoothly and gradually adjust the pitch attitude as the airplane decelerates to touchdown speed and starts to settle, so the proper landing attitude is attained at the moment of touchdown. The slightest error in judgment and timing will result in either ballooning or bouncing. The recovery from floating will depend on the amount of floating and the effect of any crosswind, as well as the amount of runway remaining. Since prolonged floating utilizes considerable runway length, it should be avoided especially on short runways or in strong crosswinds. If a landing cannot be made on the first third of the runway, or the airplane drifts sideways, the pilot should EXECUTE A GO-AROUND.

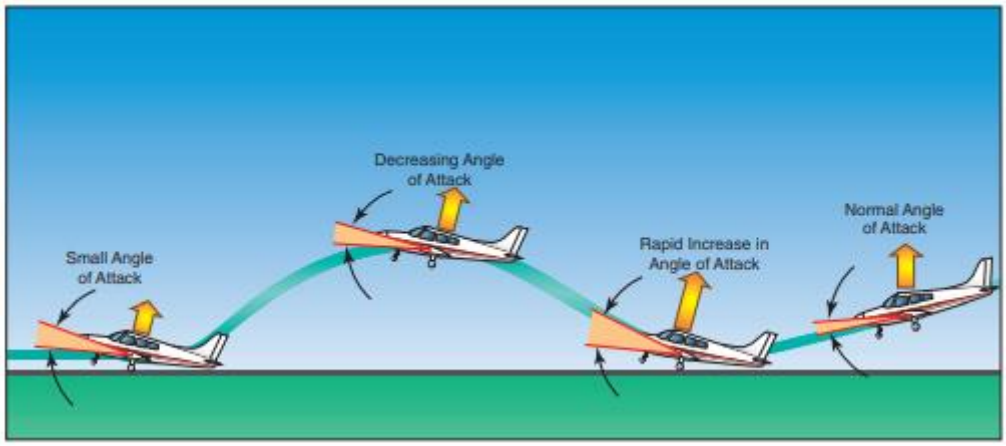

Illustration 1: Bouncing during touchdown. (Source: Airplane flying handbook FAA-8083-3A)

Porpoising (Source: Airplane Flying Handbook FAA-8083-3A)

In a bounced landing that is improperly recovered, the airplane comes in nose first setting off a series of motions that imitate the jumps and dives of a porpoise— hence the name. [Figure 3] The problem is improper airplane attitude at touchdown, sometimes caused by inattention, not knowing where the ground is, mis trimming or forcing the airplane onto the runway. Ground effect decreases elevator control effectiveness and increases the effort required to raise the nose. Not enough elevator or stabilator trim can result in a nose low contact with the runway and a porpoise develops. Porpoising can also be caused by improper airspeed control. Usually, if an approach is too fast, the airplane

floats and the pilot try to force it on the runway when the airplane still wants to fly. A gust of wind, a bump in the runway, or even a slight tug on the control wheel will send the airplane aloft again. The corrective action for a porpoise is the same as for a bounce and similarly depends on its severity. When it is very slight and there is no extreme change in the airplane's pitch attitude, a follow-up landing may be executed by applying sufficient power to cushion the subsequent touchdown, and smoothly adjusting the pitch to the proper touchdown attitude. When a porpoise is severe, the safest procedure is to EXECUTE A GO-AROUND IMMEDIATELY. In a severe porpoise, the airplane's pitch oscillations can become progressively worse, until the airplane strikes the runway nose first with sufficient force to collapse the nose gear. Pilot attempts to correct a severe porpoise with flight control and power inputs will most likely be untimely and out of sequence with the oscillations, and only make the situation worse. No attempt to salvage the landing should be made. Full power should be applied while simultaneously maintaining directional control and lowering the nose to a safe climb attitude.

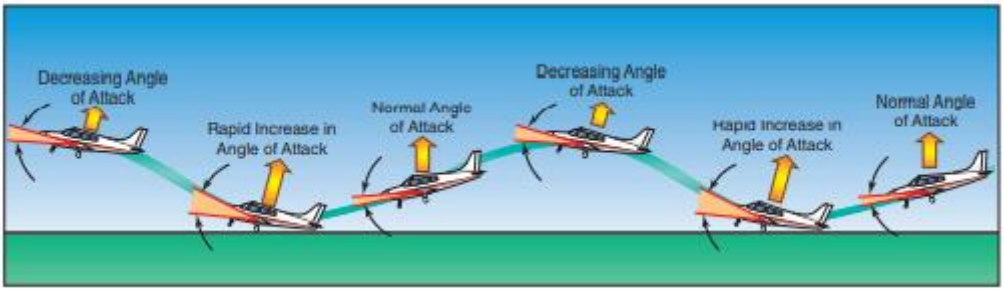

Illustration 2: Porpoising. (Source: Airplane Flying Handbook FAA-8083-3A)

Probable Cause

The aircraft was low on approach, which led the pilot to increase power, reduce flap setting to 50% and increase speed to 83kt in preparation for a go-around. When the aircraft was over the runway threshold, the pilot elected to land the aircraft which caused it to porpoise due to high air speed and 50% flap setting. The pilot reduced the speed, which resulted in the aircraft landing hard and bouncing several times before veering off to the left-side of the runway.

Contributing Factor(s)

None.

Safety Actions

❖ A decision was taken by the ATO that *the student pilot will fly a remedial flight of 5 hours with the primary instructor and the following aspects will be focused on:*

- *Flying stable approach.*
- *Recovery from low approaches.*
- *Controlling the aircraft with power on during landings.*
- *Go-around technique at different altitudes, power settings and configurations.*
- *Recap of all circuit emergencies.*

- *The student pilot is to be briefed on circuit emergencies with emphasis on unstable approaches, bouncing, ballooning on landing and recovery techniques.*
- *The student pilot is to watch Cirrus Approach take-off and landing videos.*
- *After the above training is complete, the student pilot will fly with the chief flight instructor (CFI) or head of training as an initial solo sign out in the circuit before solo training can be commenced.*

Safety Message

To prevent these types of accidents, pilots are reminded to always be vigilant during the critical stages of flight such as take-offs and landings. Also, when in doubt, pilots are to opt for a go-around.

About this Report

The decision to conduct a limited investigate is based on factors, including whether the cause is known and the evidence supporting the cause is clear, the level of safety benefit likely to be obtained from an investigation and that will determine the scope of an investigation. For this occurrence, a limited investigation has been conducted, and the Accident and Incident Investigations Division (AIID) has relied on the information submitted by the affected person/s and organisation/s to compile this limited report. The report has been compiled using information supplied in the initial notification, as well as from follow-up desk top enquiries to bring awareness of potential safety issues to the industry in respect of this occurrence, as well as possible safety action/s that the industry might want to consider in preventing a recurrence of a similar occurrence.

All times given in this report are Co-ordinated Universal Time (UTC) and will be denoted by (Z). South African Standard Time is UTC plus 2 hours.

Purpose

In terms of Regulation 12.03.1 of the Civil Aviation Regulations (CAR) 2011 and ICAO Annex 13, this report was compiled in the interest of the promotion of aviation safety and the reduction of the risk of aviation accidents or incidents and not to apportion blame or liability.

Disclaimer

This report is issued by:

Accident and Incident Investigations Division
South African Civil Aviation Authority
Republic of South Africa